Emerging Issues in Global Environmental Policy

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Policy issues inherent in emerging global environmental problems may be viewed as relating to various sectors of the environment, to particular regions, to sectors of human society, to the adjustment of human society to environment, or to methods of examining those problems. This view is only one among several held by students of the environment, but it provides a convenient framework within which to attempt to recognize some issues that now appear to deserve increasing attention.

Whether dealing, for example, with a natural sector such as water balance, or a region such as the Aral Sea Basin, or a human sector such as urban population, or a human adjustment such as water management, there are a few policy issues occurring across most of them. Recent experience with a wide range of global environmental problems suggests that there are at least three such types of issues. These are the policies to be followed in: i)identification of problems; ii) the audit of past and current efforts to deal with the problem; and iii) the integration of diverse social communities and values in assessing it. Others might be stated, but these seem particularly troublesome in the near future.

Defining Problems

From the record of the past half century it seems certain that new problems of physical, biological, and social change, not now widely anticipated, will arise in the next half century. This is because our scientific knowledge of each of those systems is incomplete, the volume of human population and its demands are increasing relentlessly, and the possible human adjustments and adaptations, including technology, are multiplying. It would be comforting, but probably misleading, to assume now that 50 years after the Rio Summit Conference the outstanding problems will be the same as those then described.

Consider the changing understanding of only three of the problems that commanded attention at Rio. They are: acid rain; stratospheric ozone depletion; and global climate warming. None was viewed commonly in either scientific or policy circles in 1972 as a major significance. From a review of their evolution made for the Carnegie Commission on Science, Technology, and Government in 1993 (1) it is plain that the process of defining those problems as calling for serious public attention had at least four characteristics in common:

i. They were recognized through research cutting across two or more traditional scientific disciplines.
ii. They involved cooperation among scientists in two or more nations.
iii. Their pursuit involved considerable serendipity, so that the type of findings was not as expected in the early stages.
iv. None was initiated in the first instance by a government research organization.

After initial definition, the basic inquiries provoked much more intensive investigation in separate disciplines, stimulated more distinctly national teams, and led to extensive research by government scientific groups. This progression is familiar to all of us.

It will be recalled that prior to the Villach conference on the greenhouse gases report edited by Bolin, Döös, Jäger, and Warrick in 1986 there was almost no intensive research on the topic (2). In just a few years, the cooperative efforts encouraged by the Advisory Group on Greenhouse Gases (ICSU, UNEP, and WMO) were expanded, took root in many countries, and were replaced by an international intergovernmental program.

A sobering lesson is that if, under present organization, further radical gains in definition of evolving environmental problems are to be expedited with reasonable speed it will be important to cultivate interdisciplinary, international, nongovernment efforts enjoying a large latitude for innovation.

The issue is whether or not there will be adequate organization in future to so define emerging problems promptly and accurately. The instruments for such definition include a wide range of scientific groups embracing individuals, universities, unions such as those represented in the Scientific Committee on Problems of the Environment, research institutes such as the International Institute for Applied Systems Analysis, and government research units.

In addition, there is an important role for gatherings that systematically assemble and critically review new efforts by government and nongovernment workers. The

United Nations conferences are one such device, but they have limitations.

Taking water as one problem sector, and building on the Mar del Plata Conference in 1977, there was the Dublin Water Conference in 1992 looking to the summit Rio Conference. These have the advantages and disadvantages of international government management. *The Stockholm Water Symposium* seeks to embrace a wider representation of scientists and policy makers (3,4) and has been reinforced by initiatives of the World Bank and the United Nations Development Program in moving toward a Global Water Partnership. It was not until recent months, however, that a World Water Council was organized to explicitly include UN agencies, national governments, regional groups, scientific unions, industries, and all interested nongovernment groups in arranging forum appraisals of past efforts at water management and new perspectives on the science of water and related resources (5). This will draw from the experience of the World Energy Council and similar forums. Policy questions include whether or not additional organizations would be effective, and whether or not similar forums should be established for other fields.

Post Audits

A remarkable feature of most major activities to deal with environmental problems is that while great attention is given to plans for remedial programs and to describing their components in terms of expenditures, personnel, areas covered, and legal actions, only a very small amount of effort is given to assessing the actual outcome in terms of the health of ecosystems and human beings. Library shelves are crammed with descriptions of plans and of outlays of people, money, and official documents, but it requires only a small table top to hold genuine comprehensive post audits of what has in fact resulted.

The recent *Dobříš Assessment* on the European environment is a promising and major advance in appraising action and results on a continental scale (6), but there are many significant topics that deserve further assessment. Consider a few examples.

During the 1970s there was an International Decade for Drinking Water and Sanitation, but very little attempt to find out precisely what effects those investments had on human health. Only recently have there been careful investigations of the factors that make for genuine success. It came to be recognized that engineering works may be of little benefit unless accompanied by community consultation and by alteration of household behavior. In Egypt during the 1950s, a centralized government program was undertaken to provide potable water to more than 85% of the population by building village supplies. Yet, the effects on diarrheal disease among children were very modest (7). Recognition of this situation, and an appraisal of the International Decade by the Consultative Council on Water supply and Sanitation led to several initiatives to make that type of improvement effort more effective. These included greater attention to community consultation in planning before a project is initiated, thereby assuring participation in upkeep, and greater attention to systematic programs to test the need for changes in the behavior of beneficiaries (8,9).

When an international group under UNEP sought, a few years ago, to prepare a diagnosis of the ills besetting the Aral Sea basin, it was painfully clear that there was serious lack of appraisal of what in fact had been the benefits and costs of various remedies that were considered. It was difficult to discern symptoms and causes, but far more difficult to prescribe remedies with confidence.

The same problem arises with the *International Decade for Natural Disaster Reduction*, now half concluded. There is much activity in processing and distributing the stock of scientific findings on natural hazards' occurrence and risk. We know that in many areas the loss of life from those extreme events has decreased as a result of improved forecasts and emergency response, but there have been few careful examinations of why the burden of property loss continues to rise. For example, in the United States a National Research Council committee looking to the decade in 1987 estimated that it would result in a 50% reduction in losses within 10 years. There was no scientific base for such a forecast, and by mid-decade the losses were far greater than in any previous five-year period (10,11).

We know from these and numerous other sets of experience that conditions for a truly useful post-audit include: i)insightful analysis of effects; ii) involvement of the various communities affected; and iii) agreement on standards of social and environmental value to be used in auditing the outcomes.

Integrating Diverse Communities and Values

Public and private decisions as to further action can only be beneficial in the long run if they involve use in both planning and post-audit of the whole range of interest groups affected and if there is something

approaching agreement on the values that are to be honored by all those groups.

One good example is in the planning and execution of water management. We have seen how the concept of unified river-basin development, with national and powerful urban engineering groups playing the leading role, has slowly evolved to include increasingly the cooperation of farmers, industry, and smaller communities to consider all aspects of the affected eco-systems in a watershed. This requires rough agreement on the means of setting a value on the full human and environmental impacts of any intervention in the environment. There are just beginning to be available refined and generally acceptable methods of roughly quantifying the complex set of benefits and costs (12). Lacking such consensus, not solely by economists and government officials but by the local communities and by those concerned with ecosystem maintenance, there cannot be fully acceptable plans and policies. Without it there will continue to be deep and bitter dispute over the wisdom of specific dam projects, effluent control programs, schemes for maintenance of biodiversity, projects for reversal of desertification, and many other environmental programs.

An example of a challenge that no country has thus far met effectively is the problem of disposal of high-level nuclear waste. What mode of disposal, where, and how, will meet the aims sought by all interested sections of society? The contrast between Swedish and United States approaches may illuminate a few of the difficulties. Sweden has moved toward decentralized consultation with all groups possibly affected, while the United States has by Congressional action decided to characterize only one site and meanwhile consider some kind of interim storage. In the United States, the responsible executing agency probably enjoys as low a degree of public confidence as any government branch in the country. and a permanent solution seems far in the future. At stake are the methods employed in physical, biological, and engineering studies, and in the evaluation of the results. This requires careful consideration of the ecosystem and human population possibly affected, and the risks they are prepared to bear for themselves and future generations. The time horizon is not the usual pay-off period of a construction bond but at least 100 000 years of toxic threat (13).

These three issues of definition, auditing, and values have certain elements in common. Each seeks to examine and deal with the environment as a highly diverse but integrated system. Each is concerned finally with the whole range of physical, biological, and human components. Each recognizes that solutions must take account of the converging values of diverse segments of human society.

Perceptions of the Earth

It seems likely that the next generation will have to wrestle with these among other policy issues. I shall not be around to see how they will be resolved. But I am convinced that solutions, in time, perhaps haltingly and with blunders, will be found. This stems from observing how, in my lifetime, the human race has moved toward an expanded perception of itself as a part of the biosphere.

Early in the century, the strong emphasis of many scientists was on surveying the air, water, land, and biota of the continents and oceans (14). The earth was the object of mapping, of description, of research intended to illuminate process.

Before long the emphasis shifted to the modes and conditions of development. To cope with rising population, advancing technology, and expanding demands, attention shifted toward development plans to ways of economically using resources in the short run. In the first world conference on natural resources in Lake Success in 1949 the emphasis was on conservation and utilization of natural resources, and there was concern for river basin and agricultural and forest use.

By the time of the Stockholm Conference in 1972 serious questions were being raised about threats to the integrity of the biosphere. Global environmental monitoring systems and environmental impact assessment methods took hold. Research efforts in large degree were targeted at changes and resultant risks and means of coping.

By the 1990 Moscow Global Forum of Spiritual and Parliamentary Leaders looking to the Rio Conference in 1992 people around the world were perceiving the earth as more than a globe to be surveyed or developed for the welfare of some publics, or to be protected from threats to its sustainability, both natural and human. It was seen as all of those in some degree but also in a broader context.

Notwithstanding yawning gaps in environmental knowledge and faulty methods of analyzing issues of policy and persistent conflict, there is some ground for confidence. It comes from recognizing that more and more intelligent, sensitive people around the world are sharing--whether they are government administrators or laboratory scientists or diligent farmers or industrial

policy and persistent conflict, there is some ground for confidence. It comes from recognizing that more and more intelligent, sensitive people around the world are sharing--whether they are government administrators or laboratory scientists or diligent farmers or industrial managers--in efforts to understand and maintain the earth as the one material and spiritual home for one human family.

References and Notes

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15. This paper was adapted from a lecture on the occasion of the award of the Volvo Environment Prize, Gothenberg, 5 October 1995.

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